

IN THE SPECIFICATION:

Please replace the paragraph beginning at page 1 line 9 with the following rewritten paragraph:

--Structures such as roadways, railways, embankments, and levees must often be built on soil structures which are insufficiently strong to support their intended loads, immediately or after a considerable passage of time. Yet physical constraints require that these projects be built there. For example, a road must skirt a hill, pass through a meadow, or pass through a soggy [[a]] plain next to it. The alternative would be an unaffordable tunnel. Or perhaps a levee must be built next to a river to protect a city. The alternative of moving a city such as New Orleans itself so as to locate a levee at a more convenient location is not even to be considered.--

Please replace the paragraph beginning at page 7 line 15, with the following rewritten paragraph:

--Applicant has developed a third method, with which he assures that at all pertinent depths there will be sufficient water to react with the binder he supplies, and also that there will be a proper amount of binder at each depth. The amounts of binder and of water supplied by this third method can and often will vary [[for]] from depth to depth.--

Please replace the paragraph beginning at page 12 line 4, with the following rewritten paragraph:

--Fig. 2 is a [~~side~~] cross-section of the vane shown in Fig. 1;--

Please replace the paragraph beginning at page 13 line 23 to page 14 line 6 with the following rewritten paragraph:

--The terms "curing" and "hydration" are used interchangeably in this specification. It means whatever reaction occurs in the hardening of a powdered binder such as cement and/or lime to form from a mixture of water and powder in to a body that acts as a "paste" to bind aggregate together as a solid body. The precise chemical nature of the reaction is not important [~~what~~] . What is important is the solid result, often spoken of as a cured or hydrated body.--

Please replace the paragraph beginning at page 14 line 7, with the following rewritten paragraph:

--The objective of this invention is to produce in soil structure 11 an in-situ piling 12 that extends as a [~~cylinder~~] body of revolution below the ground surface 13. The piling has a central axis 14, and a dimension of depth 15.--

Please replace the paragraph beginning at page 15 line 3, with the following rewritten paragraph:

--The term "stoichiometric" is used herein to denote the presence of sufficient water to result with the binder ~~[[in]]~~ a

solid and reasonably consistent body. With some cements, completion of the reaction may take a very long time, measured in months. This method may or may not provide all of the water ultimately needed, although it may do so. It will, however, provide sufficient water that the in-situ piling will cure in a reasonable time to a strength consistent with the design criteria. It may or may not strengthen beyond that time, which will usually be measured in days. "Stoichiometric" does not exclude additional water. The precise amount of water needed for hydration, as the only water, is not the exclusive meaning of the term. Additional water merely dilutes the system. Provided that water is not in such a large immediate quantity as to "kill" the binder by preventing it from forming the type of binding matrix intended, excess water content is still within this invention.

Please replace the paragraph beginning on page 18 line 1 with the following rewritten paragraph:

--For those purposes, in the preferred embodiment (Fig. 5), companion injectors 35, 36 are provided in pairs at one or more locations and in numbers of pairs to be described. Injectors 35 are to provide binder, and also if desired additives such as sand. Injectors 36 are to provide water. Each injector has a respective discharge axis 37, 38. These axes intersect under in-situ (ambient) pressures adjacent to but spaced from the shaft, and where their materials mix[[,]] they have a combined component

of radial motion. They meet in a limited region 39, which under some circumstances can be regarded as a "premix" region.

Please replace the paragraph beginning on page 18 line 19 with the following rewritten paragraph:

--A binder supply at the surface provides binder under pressure from a pressurized supply source 46 to an injector through a conduit 47 (Fig. 3) that passes down the shaft and out from injector 35. The amount of binder will be under control of a binder control valve 48 (Fig. 8) which can be manually or program controlled. The binder will usually be granular or a powder, so that it can be transported by air pressure. If desired, the binder can be pre-moistened, but this risks clogging of the lines.

Please replace the paragraph beginning at page 19 line 4, with the following rewritten paragraph:

While the binder will usually be cement, lime, or a mixture of them, [~~of many~~] it may also include other ingredients such as sand.--

Please replace the paragraph beginning on page 20 line 10, with the following rewritten paragraph:

--In such an arrangement, companion injectors will preferably be located within about three inches of one another and their streams will be so directed as to intersect within about three to six inches from their injectors. Their

intersecting streams will meet and mix in a limited region such as region 39 so as to produce a mixed stream of binder and water [~~formed of water~~] from the injector. There or shortly beyond it, it will mix with water already present in the bore.--

Please replace the paragraph beginning at page 20 line 18, with the following rewritten paragraph:

--The mixture in region 39 can properly be denoted as a "premix", that is, a mixture of binder and added water, which, with the next [~~addition~~] incorporation of existing water will result in the desired piling.--

Please replace the paragraph beginning at page 22 line 3, with the following rewritten paragraph:

--Drive shaft [[51]] 57 is a hollow cylinder with a peripheral wall 52 and a central passage 53. Vanes (not shown) are driven by the shaft as in Fig. 1. Water supply pipe 42 leads from the water supply to the tool head.--

Please replace the paragraph beginning at page 22 line 20, to page 23 line 1 with the following rewritten paragraph:

Water passages 66-69 have respective water injectors 72, 73, 74, and [[70]] 75 which also discharge radially. Selection of which injector or injectors is to be used can be determined by inserting a removable plug 76 in those to be closed. These water injectors are located at selected locations relative to the binder injector. For example, it will be noted that these water

injectors can be, and in the drawings some are, pointed in opposite directions from the binder passages. They may or may not be located at the same elevation along the central axis. Thus, the emission streams from these injectors will not directly intersect. However, as will be seen, they inject their streams at such close locations and times that when a "following" stream arrives at some depth, it will soon enough encounter material from a previous stream in a condition and quality ready for complete mixing, for example, before water can drain away, such as through a sandy formation.--

Please replace the paragraph beginning at page 25 line 17, with the following rewritten paragraph:

--Fig. 9 schematically illustrates several other features of the invention. Vanes 110 and 111, similar to vanes 31 are driven by a central shaft 111a similar in function to shaft [[51]] 57.--

Please replace the paragraph beginning at page 28 line 17, with the following rewritten paragraph:

--Downhole valving can be provided, especially for the water, but for the binder will lend a complexity that is undesirable. Maintenance of super-ambient pressure in the supply lines will guard against back flow. ~~[Removal]~~ Exertion of pressure sufficient to drive the binder or water will prevent back flow and if not excessive, will not drive binder out of the nozzle.--

Please replace the paragraph beginning at page 28 line 23, with the following rewritten paragraph:

--Water can be valved directly by the operator, [~~now of~~
~~desired,~~]. If desired appropriate valving can be provided
downhole.--